

What is claimed is:

1. A system comprising:

a substrate;

5 a seed layer; and

a hard bias layer, wherein magnetization of the hard bias layer exhibits uniaxial magnetic anisotropy.

10 2. The system of claim 1, wherein the hard bias layer comprises a thin film, wherein magnetic axes of grains in the hard bias layer are oriented within ± 60 degrees with respect to a linear axis, the linear axis being parallel to the thin film.

15 3. The system of claim 2, wherein the hard bias layer comprises a ferromagnetic hexagonal close pack material, and wherein the magnetic axes of the grains comprise c-axes.

4. A method of manufacturing a magnetic read head hard bias layer and seed layer comprising:

depositing a seed layer on a substrate, wherein seed layer ions have a first angle of incidence with respect to a normal of the substrate; and

20 depositing a hard bias layer on the seed layer, wherein hard bias layer ions have a second angle of incidence with respect to the normal of the substrate, wherein magnetization of the deposited hard bias layer exhibits uniaxial magnetic anisotropy.

25 5. The method of claim 4, wherein the first angle of incidence is greater than or equal to 30 degrees.

6. The method of claim 4, wherein the second angle of incidence is greater than or equal to 30 degrees.

30 7. The method of claim 4, wherein the first angle of incidence is different from the second angle of incidence.

8. The method of claim 7, wherein the first angle of incidence is greater than the second angle of incidence.

5 9. The method of claim 7, wherein the first angle of incidence is between 60 and 70 degrees.

10 10. The method of claim 7, wherein the second angle of incidence is between 35 and 45 degrees.

11. The method of claim 4, wherein the substrate is not rotated during deposition of the both the seed layer and the hard bias layer.

15 12. The method of claim 4, wherein the substrate is rotated up to ± 20 degrees relative to the normal during layer growth.

20 13. The method of claim 4, wherein the hard bias layer comprises a thin film, wherein magnetic axes of deposited grains of the hard bias layer are oriented within ± 60 degrees with respect to a linear axis that is parallel the thin film.

25 14. A magnetic read sensor comprising:
a substrate;
a free layer;
a hard bias layer, wherein grains of the hard bias layer have uniaxial magnetic
anisotropy; and
a seed layer for the hard bias layer.

30 15. The sensor of claim 14, wherein the seed layer has a thickness of at least 10 angstroms.

16. The sensor of claim 14, wherein the hard bias layer comprises a ferromagnetic hexagonal close pack material, and wherein c-axes of the grains are oriented within ± 60 degrees with respect to an in-plane axis.

5 17. The sensor of claim 14, further comprising:
an antiferromagnetic layer;
a high coercivity ferromagnetic pinned layer; and
a non-magnetic metallic layer.

10 18. The sensor of claim 17, wherein sensor comprises an ultra contiguous junction read
sensor.